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EXTENSION NOTE #13
February 1994

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Southern Interior Watershed Assessment Procedure

This Extension Note reviews the draft Watershed Assessment Procedure for the Southern Interior of British Columbia, September 1993 version. The new flow chart and sample watershed should help readers visualize the steps associated with a watershed assessment.

BACKGROUND

A watershed assessment should be carried out before forestry activities are expanded in areas with stream resources of high value. Rate-of-cut guidelines and subjective procedures were used to achieve this in the past. The draft *Southern Interior Watershed Assessment Procedure*, released in September 1993, is expected to be a useful tool for several reasons:

1. Watershed assessments will be required by the Forest Practices Code, the Community Watershed Guidelines, and the Interior Fish/Forestry & Wildlife Guidelines.

2. The new Procedure will allow Regional staff to respond to requests for watershed assessments more quickly because a large part of the workload can be done without a hydrologist. This will be useful since requests for assessments are expected to increase.

3. The new Procedure is expected to produce more reliable and defensible results, since assessments will be more objective and standardized than previous methods. As the new Procedure is applied to more watersheds, the results will be compiled into a single database for easier comparisons among watersheds.

The draft Southern Interior Watershed Assessment Procedure has been developed by a committee of members

RESEARCH Section, Ministry of Forests, Cariboo Forest Region
200 – 640 Borland Street, Williams Lake, BC V2G 4T1 Phone (250)398-4345
Fax (250)398-4380 http://www.for.gov.bc.ca/cariboo/research/research.htm

from B.C. Environment, the B.C. Forest Service, the federal Department of Fisheries and Oceans, and the forest industry. Revisions to the Procedure will follow comments from users.

An assessment is now broken down into three levels of detail. Level 1 is a screening process and is essentially a rate-of-cut analysis. Level 3 is a detailed assessment that requires a considerable amount of field and office work by the regional hydrologist or other specialists. Most of the committee's work has focused on what is now called a Level 2 Assessment.

The new Level 2 Assessment contains objective questions about watershed features and a scoring method which predicts stream condition. The questions that will be used to generate Level 2 Assessment scores were released in the September 1993 Draft Procedure document.

AN OVERVIEW OF THE PROCEDURE

Figure 2 shows the sequence of events for a watershed assessment. They correspond with the steps described in the September 1993 Draft Procedure document. Please refer to that document for a full description.

Level 1 Assessment

The starting point for a watershed assessment is to determine whether there is an instream resource that needs to be protected. In the Cariboo Forest Region, the main instream resources are domestic water supply and fish habitat. Others include irrigation water supply, aesthetics, and stream stability where it might affect roads, bridges, or other structures. A watershed assessment begins by identifying the "point of concern" in a stream, since this is what determines the watershed area. In order to provide sufficiently detailed planning information, a large watershed is broken down into sub-basins which are assessed individually, as shown in Figure 1.

The Level 1 Assessment consists mainly of defining instream resources, dividing the watershed into appropriate sub-basins, and doing a rate-of-cut analysis. The results will indicate whether a Level 2 Assessment should be done on the entire watershed or any tributary watersheds.

Level 2 Assessment

The goal of a Level 2 Assessment is to extract as much information as possible about a watershed's condition using maps, photos and forest cover data. It was designed to speed up the process of doing watershed assessments by allowing the licensee, district or other interested party to be a major contributor to the process.

The Level 2 Assessment consists of answering objective questions and generating scores. The questions relate to roads, terrain, soils and other features, and are designed to be answered by a technician. This is expected to take about one person-week for a typical watershed, depending on the level of development. The Regional Hydrologist then uses the answers to generate scores for peak streamflow, surface erosion, landslides and channel stability. The scoring methods have been designed based on sample watersheds with a representative range of impacts.

One of the most important characteristics of the Level 2 Assessment is the separation of the results into objective and subjective components. The answers to the objective questions are verifiable. The next step is to use these answers to generate scores which predict the level of stream impact. This scoring system produces quantitative results but is based on subjective criteria developed by the committee. Since the Level 2 Assessment has been divided into these two components, the scoring system can undergo continued testing and improvement without affecting the answers to objective questions on individual watersheds.

In the future, the Level 2 Assessment should be useful for district and licensee staff by allowing potential impacts associated with different planning scenarios to be quickly evaluated. This will be most convenient when the information is available in a geographic information system.

Level 3 Assessment

A Level 3 Assessment is necessary if the Level 2 Assessment of the final plan produces high hazard scores in any of the four categories: peak streamflow, suspended sediment, landslides or channel change. It may also be done in response to some unusual event, such as a serious landslide into fish-bearing waters. This level of assessment requires a considerable amount of photo

interpretation and/or field work. There is no precise format and any results, conclusions or recommendations would be based on professional judgement. A Level 3 Assessment would normally be done by an earth science professional.

THE NEXT STEP

The Level 2 Assessment is expected to be the most useful part of the new procedure. The Procedure needs testing in order to refine and finalize the scoring methods. This involves answering the questions on sample watersheds in the range of about 10 to 100 square kilometres. The results of these "test" assessments will be used to refine the scoring methods.

The new Procedure is expected to be a useful planning tool for decisions in forest land management. They will be more objective than previous methods and will allow districts, licensees and other agencies to be more involved. The assistance of potential users during the test phase will therefore be greatly appreciated.

CONTACT

Please contact **Patrick Teti**, Regional Research Hydrologist, at 398-4752 if you would like to help verify the draft Watershed Assessment Procedure.

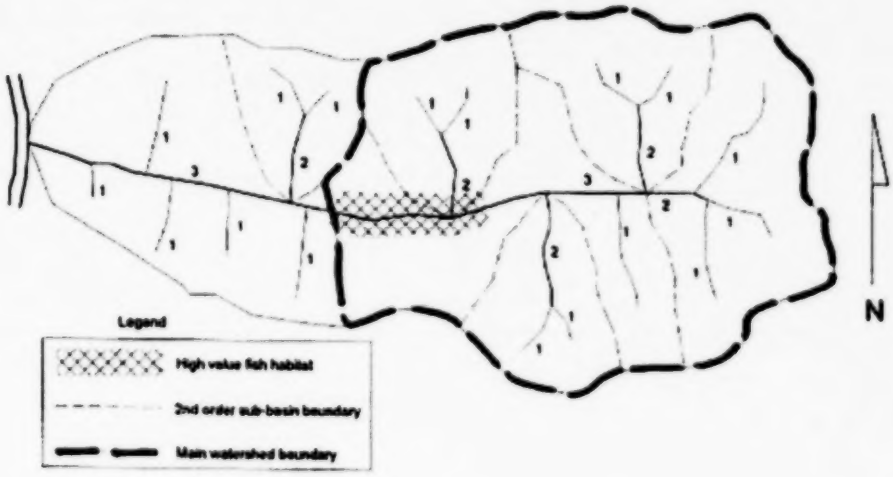

Figure 1 - Sample Watershed
Identifying Points of Interest and Dividing into Sub-basins

- Identify points of interest at an interagency meeting. In this example, high value fish habitat is indicated by hatches.
- Determine stream orders using solid line streams on 1:50,000 maps. Stream orders are labelled in the example next to stream segments
- Divide the watershed into sub-basins. The high value fish habitat is in a third order channel; therefore, sub-basins containing second order channels are identified. There are four such sub-basins upstream from the point of interest. The main watershed and the four sub-basins would be subjected to Level 2 Assessment if they met the Level 1 criteria

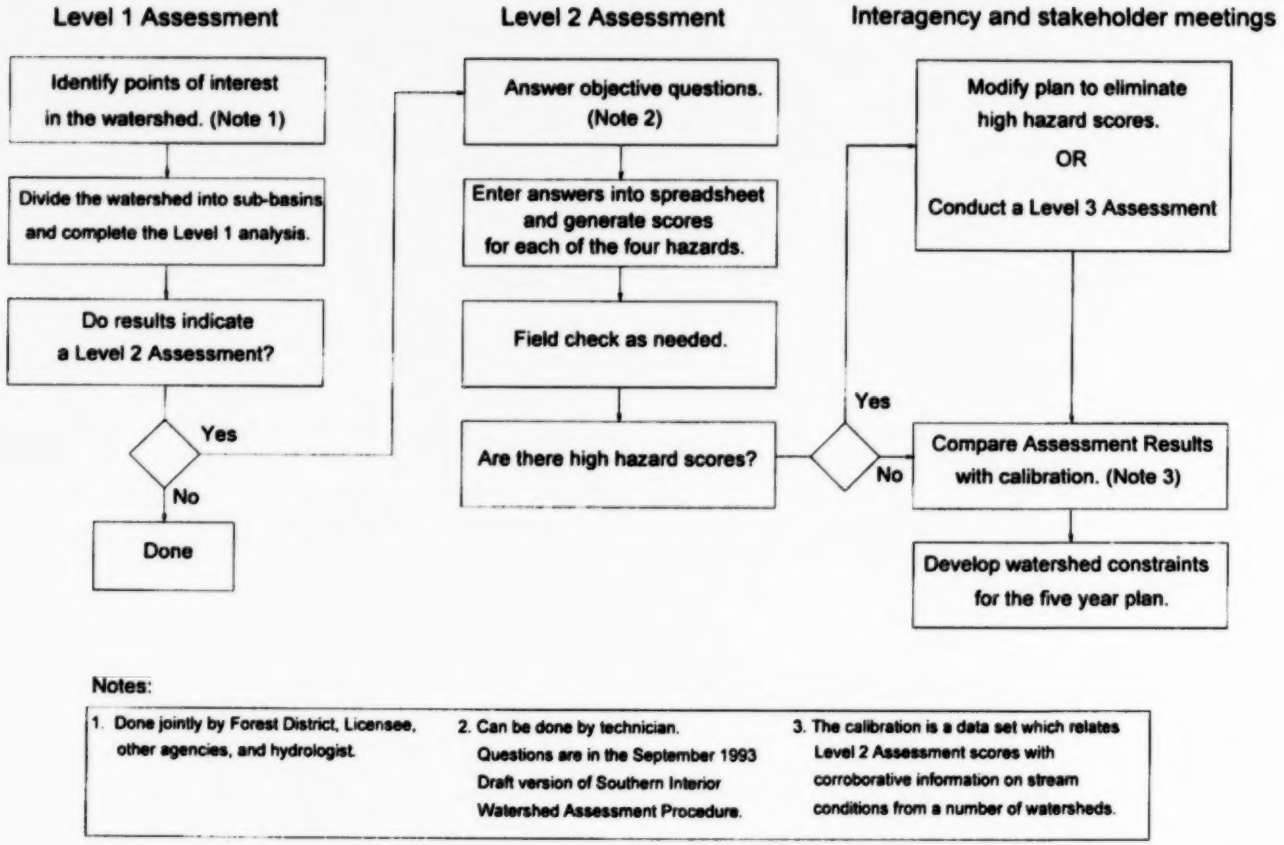
Level 1 Assessment
Level 2 Assessment
Interagency and stakeholder meetings
Identify points of interest in the watershed. (Note 1)
Divide the watershed into sub-basins and complete the Level 1 analysis.
Do results indicate a Level 2 Assessment?
Yes
No
Done
Answer objective questions. (Note 2)
Enter answers into spreadsheet and generate scores for each of the four hazards.
Field check as needed.
Are there high hazard scores?
Yes
No
Modify plan to eliminate high hazard scores.
OR
Conduct a Level 3 Assessment
Compare Assessment Results with calibration. (Note 3)
Develop watershed constraints for the five year plan.
Notes:
1. Done jointly by Forest District, Licensee, other agencies, and hydrologist.
2. Can be done by technician. Questions are in the September 1993 Draft version of Southern Interior Watershed Assessment Procedure.
3. The calibration is a data set which relates Level 2 Assessment scores with corroborative information on stream conditions from a number of watersheds.

FIGURE 2

Summary of Steps in the Southern Interior Watershed Assessment Procedure

September 1993 Draft